

ABSTRACT of LECTURES  
to be presented by  
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(Jet Propulsion Laboratory/Caltech)  
at the International School of Physics  
" Enrico Fermi "  
in Varenna, Italy  
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Three lectures will be given. The first one will draw from the general literature on microwave sounding from space. The next two will focus on a description of the Microwave Limb Sounder (MLS) and results obtained from its measurements relating to atmospheric chemistry and dynamics; this will draw from material recently published (or soon-to-be published) by the MLS team.

LECTURE 1.

MICROWAVE SOUNDING FROM SPACE: OVERVIEW OF TECHNIQUE AND APPLICATIONS

The general principles of microwave sounding from space will be presented. The focus will be on passive remote sounding of the atmosphere. We will discuss specific examples of previously flown instruments and the geophysical parameters inferred from those measurements.

LECTURE 2.

MICROWAVE SOUNDING FROM SPACE: DESCRIPTION OF THE MICROWAVE LIMB SOUNDER (MLS)

The Microwave Limb Sounder (MLS) was built by NASA's Jet. Propulsion Laboratory as part of the Upper Atmosphere Research Satellite (UARS), launched from the Space Shuttle on September 12 1991. This instrument measures thermal emission at frequencies of 63, 205, and 183 GHz.

A description of the instrument will be given, along with the spectroscopic features of interest. The radiative transfer model and retrieval method used to calculate tangent pressure, atmospheric temperature and gas abundances will be discussed.

### LECTURE 3.

#### MICROWAVE SOUNDING FROM SPACE: RESULTS FROM 'THE MICROWAVE LIMB SOUNDER (MLS)

Results from the first two years of measurements from the Microwave Limb Sounder aboard UARS will be shown. For the first time, measurements were made of global stratospheric ClO, the dominant reactive form of chlorine - which leads to ozone destruction - . Significant enhancements in ClO in the northern and southern winter polar vortex regions were observed. Ozone depletion over Antarctica was also evident in the winter/spring, along with dehydration in the lower stratosphere. Furthermore, SO<sub>2</sub> emitted by the Mt Pinatubo volcano (which erupted in June 1991 in the Philippines) was mapped by MLS; the SO<sub>2</sub> decay was used to infer an abundance for OH, an important radical in stratospheric chemistry. Other aspects of the MLS data will be reviewed.